



Climate change and waterborne disease risk in the Great Lakes region of the U.S

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Abstract:

Extremes of the hydrologic cycle will accompany global warming, causing precipitation intensity to increase, particularly in middle and high latitudes. During the twentieth century, the frequency of major storms has already increased, and the total precipitation increase over this time period has primarily come from the greater number of heavy events. The Great Lakes region is projected to experience a rise these extreme precipitation events. For southern Wisconsin, the precipitation rate of the 10 wettest days was simulated using a suite of seven global climate models from the UN Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report. For each ranking, the precipitation rate of these very heavy events increases in the future. Overall, the models project that extreme precipitation events will become 10% to 40% stronger in southern Wisconsin, resulting in greater potential for flooding, and for the waterborne diseases that often accompany high discharge into Lake Michigan. Using 6.4 cm (2.5 in) of daily precipitation as the threshold for initiating combined sewer overflow into Lake Michigan, the frequency of these events is expected to rise by 50% to 120% by the end of this century. The combination of future thermal and hydrologic changes may affect the usability of recreational beaches. Chicago beach closures are dependent on the magnitude of recent precipitation (within the past 24 hours), lake temperature, and lake stage. Projected increases in heavy rainfall, warmer lake waters, and lowered lake levels would all be expected to contribute to beach contamination in the future. The Great Lakes serve as a drinking water source for more than 40 million people. Ongoing studies and past events illustrate a strong connection between rain events and the amount of pollutants entering the Great Lakes. Extreme precipitation under global warming projections may overwhelm the combined sewer systems and lead to overflow events that can threaten both human health and recreation in the region.

Source: <http://dx.doi.org/10.1016/j.amepre.2008.08.026>

Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change;
surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Climate Change and Human Health Literature Portal

Health Professional, Researcher

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Quality, Precipitation

Food/Water Quality: Biotoxin/Algal Bloom, Pathogen

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Geographic Location:

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: Campylobacteriosis, Cryptosporidiosis, E. coli

Medical Community Engagement:

resource focus on how the medical community discusses or acts to address health impacts of climate change

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Children, Elderly, Pregnant Women

Resource Type:

Climate Change and Human Health Literature Portal

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content